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**FEBRUARY 20, 2003**

**PROJECT 02-543  
REPORT OF GEOTECHNICAL EXPLORATIONS**

**For**

**NORTHEAST INDUSTRIAL PARK  
CAMBRIDGE, MINNESOTA**

**Prepared For:**

**CITY OF CAMBRIDGE  
and  
SHORT ELLIOTT HENDRICKSON, INC.**



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February 20, 2003

Mr. Todd Blank, P.E.  
Short Elliott Hendrickson, Inc.  
Cambridge City Engineer  
626 North Main Street  
Cambridge, MN 55008

RE: 02-543            Report of Geotechnical Exploration  
                         Northeast Industrial Park  
                         Cambridge, Minnesota

Dear Mr. Blank:

Independent Testing Technologies, Inc. is pleased to submit the results of our subsurface investigation program for this project in Cambridge, Minnesota. This report represents our work for this project as authorized by you. Three copies are enclosed.

The soils on this site are fairly well suited for the proposed utility installation and street construction. The majority of the soils encountered were poorly graded sands (SP), poorly graded sands with silt (SP-SM), and silty sands (SM). Groundwater was observed during drilling and it will have an impact on project design and construction. Soil samples obtained during our investigation will be stored at our office for thirty days after the date of this report. After that time, they will be disposed of unless you advise otherwise.

Mr. Blank, it has been our pleasure to work with you on this project. Please contact us if you have any questions or need additional services.

Sincerely,

Wayne C.B. Stark, P.E.  
MN Registration #26093

## CERTIFICATION

**I hereby certify that this report was prepared  
by me or under my direct supervision and that I am a  
duly Registered Engineer under the laws  
of the State of Minnesota.**

  
Wayne C.B. Stark

Date: 02/20/03 Registration No.: 26093

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**GEOTECHNICAL EXPLORATIONS  
CITY OF CAMBRIDGE  
and  
SHORT ELLIOTT HENDRICKSON, INC.  
NORTHEAST INDUSTRIAL PARK  
CAMBRIDGE, MINNESOTA  
PROJECT 02-543**

**A. Introduction**

**This report is being prepared for use by our client on this specific project. We intend to present this report and our findings in the same logical manner that led us to arrive at our recommendations. This report is based on some general assumptions regarding the anticipated construction based on experience with similar projects. These assumptions and the entire report should be reviewed immediately upon receipt.**

**Purpose:**

The purpose of our investigation was to evaluate the existing soil and water conditions on this site. The project consists of sanitary sewer, water main, and storm sewer installation as well as street construction. In accordance with your written authorization, we have conducted a subsurface exploration program for the proposed project.

**Scope of Services:**

Our authorized scope of services included the following:

1. To investigate the subsurface soil and water conditions encountered at twenty-three (23) split-spoon boring locations. The boring depths were planned to range from 10 to 30 feet. The approximate locations are shown on the boring location plan in Appendix 1.
2. To perform fifteen (15) grain size analyses and twenty (20) moisture content tests on collected soil samples.
3. To provide a report of our findings including the results of our subsurface investigation and testing.

**General Site Conditions:**

The proposed project site includes:

1. North Superior Avenue from North Emerson Street to North Harrison Street.
2. North Harrison Street from North Superior Avenue to it's northern terminus.
3. The area bounded by Trunk Highway 65 and North Main Street on the west, 343<sup>rd</sup> Avenue Northeast on the north, and Xylite Street on the east.

All of the project is located within the City of Cambridge, Minnesota. The majority of the site is gently sloping with grades of 0 to 6%.

**Available Subsurface Information:**

According to the Geologic Map of Minnesota, Quaternary Geology, prepared by Howard C. Hobbs and Joseph E. Goebel (1982, Minnesota Geological Survey), this site lies within an outwash unit, undivided as to moraine association. It is associated with the Des Moines Lobe glaciation of Pleistocene, Late Wisconsinan age. The drift is derived from parent material in Manitoba and eastern North Dakota.

According to the Soil Survey of Isanti County prepared by the Soil Conservation Service, the site lies within the Zimmerman-Lino soil association. These consist of poorly drained to somewhat excessively drained, moderately coarse to coarse textured soils over glacial till and of the outwash plains on gentle to moderate slopes. The individual soils mapped on this site are Anoka loamy fine sands and Lino loamy fine sands.

## **B. Exploration Program**

Twenty-one (21) split-spoon borings were conducted on this project. The borings were advanced to depths ranging from 10 to 30 feet, using a 3 1/4 inch I.D. hollow stem auger. Samples were obtained every 2 1/2 feet for the first 15 feet and every 5 feet thereafter using a 2-inch O.D. split spoon sampler in accordance with the American Society for Testing and Materials (ASTM D1586). Standard penetration values (N-values) were obtained at each sample interval by driving the sampler into the soil using a 140-pound hammer falling 30 inches. After an initial set of 6 inches, the number of blows required to drive the sampler 12 inches is known as the standard penetration resistance or N-value. Where the sampler can not be driven at least 6 inches by 50 blows of the hammer, the total number of blows as well as the distance driven is reported on the boring logs.

Groundwater levels were noted during drilling and immediately after completion. The holes were backfilled with the auger cuttings. Some settlement of the bore holes may be expected. All of the borings were conducted with a truck mounted drill rig. The boring locations were staked in the field by SEH and most of the borings were conducted within 2 feet of the surveyed location. Borings B-21 and B-23 were not conducted due to site conditions, instead hand augers were completed at those locations. These two hand augers were advanced to 10 feet deep using a 3-inch bucket auger.

### **Exploration Results:**

Borings B-1, B-18, B-20, and B-22 encountered bituminous pavement from 4 to 8 inches thick followed by 4 to 7 inches of aggregate base. Brown silty sands (SM) were encountered beneath the aggregate base in all of these borings, except boring B-20, to depths of 4.5 to 5 feet. Brown poorly graded sands with silt (SP-SM) were observed in boring B-1 below these soils to 9 feet deep followed by brown and grey, poorly graded sands (SP) to termination. Boring B-18 encountered brown poorly graded sands with silt (SP-SM) below these soils to termination. Below the silty sands in boring B-22, black

organic silts (OL) were observed to 6.5 feet deep followed by grey poorly graded sands (SP) to termination. Fill material consisting of dark brown silty sands (SM) was encountered below the aggregate base in boring B-20 to 6.5 feet deep followed by grey poorly graded sands (SP) to 9 feet deep. Grey poorly graded sands with silt (SP-SM) were observed below these soils to 13.5 feet deep followed by grey poorly graded sands (SP) to termination.

All of the remaining borings, except borings B-15 and B-19, encountered topsoil material consisting of black silty sands (SM) to depths of 8 to 30 inches. Borings B-2, B-7, B-12, B-14 and B-16 encountered brown poorly graded sands with silt (SP-SM) below the topsoil to depths of 4.5 to 14 feet followed by brown poorly graded sands (SP) to termination. Below the topsoil in boring B-3, brown silty sands (SM) were observed to 2.5 feet deep followed by brown poorly graded sands with silt (SP-SM) to 6.5 feet deep and brown poorly graded sands (SP) to termination. Borings B-4, B-5, B-9, and B-17 encountered brown silty sands (SM) below the topsoil to depths ranging from 3 to 9 feet followed by brown poorly graded sands (SP) to termination.

Brown silty sands (SM) were observed below the topsoil in boring B-6 to 6.5 feet deep followed by brown and grey poorly graded sands (SP) to termination. A layer of brown silt (ML) was encountered from 3 to 3.5 feet deep in this boring. Boring B-8 encountered brown poorly graded sands with silt (SP-SM) below the topsoil to 9 feet deep followed by brown poorly graded sands (SP) to termination. A layer of brown silty clayey sands (SC-SM) was observed in this boring from 3 to 4 feet deep. Below the topsoil in boring B-10, brown poorly graded sands (SP) were observed to 3.5 feet deep followed brown silty sands (SM) to termination.

Brown silty sands (SM) were encountered below the topsoil in boring B-11 to termination.

Boring B-13 encountered brown silty sands (SM) beneath the topsoil to 5 feet deep followed by brown poorly graded sands with silt (SP-SM) to 9 feet deep and brown poorly graded sands (SP) to termination. Black organic silts (OL) were observed in boring B-15 to 5 feet deep followed by brown poorly graded sands with silt (SP-SM) to 8 feet deep and brown poorly graded sands (SP) to termination. Boring B-19 encountered ice and water to 2 feet deep followed by black organic silts (OL) to 3.5 feet deep and brown poorly graded sands (SP) to termination. Borings B-21 and B-23 encountered black organic silts (OL) to 2 and 1.5 feet deep followed by grey poorly graded sands (SP) to termination.

#### **Penetration Test Results:**

The standard penetration blow counts in the sand soils ranged from 1 to 45, which are very low to high, indicating that they are in a very loose to dense condition. The blow counts in some of the sand soils below the water table were lower on average. This is due to the unbalanced hydrostatic pressure inside the auger and disturbance of the water bearing sands during drilling. Refusal of the spoon or auger did not occur and the drilling was relatively easy in all of the borings.

#### **Water Level Observations:**

Observations of the subsurface water conditions were made during drilling operations. Groundwater was encountered in most of the borings during drilling. The following table shows the depth of the observed groundwater from the existing ground surface.

<b>Boring</b>	<b>Depth</b>	<b>Boring</b>	<b>Depth</b>	<b>Boring</b>	<b>Depth</b>
B-1	10.0'	B-8	None	B-15	1.0'
B-2	None	B-9	None	B-16	5.0'
B-3	14.0'	B-10	6.5'	B-17	9.0'
B-4	11.0'	B-11	None	B-18	None
B-5	13.5'	B-12	None	B-19	0.0'
B-6	6.5'	B-13	12.0'	B-20	7.0'
B-7	16.0'	B-14	None	B-22	6.0'

Although the water levels were observed over a short period of time, we feel they are an accurate representation of the water levels on this site at the time of our exploration. It should be noted that fluctuations in the level of the groundwater can occur due to variations in rainfall, temperature, and other factors not evident at the time of our investigation.

Mottled soils were encountered. Mottled soils are a historical indication of a temporarily or seasonally saturated soil condition. Grey soils were also observed. Grey soils are an indication of a permanently saturated soil condition.

**Laboratory Testing:**

Soil samples were collected at certain borings for grain size analyses. The following table shows at which borings the soil samples were taken and the ASTM and AASHTO classification of those soils.

<b>Gradation</b>	<b>Boring</b>	<b>ASTM</b>	<b>AASHTO</b>	<b>Gradation</b>	<b>Boring</b>	<b>ASTM</b>	<b>AASHTO</b>
G-1	B-4	SM	A-2-4	G-13	B-1	SP	A-1-b
G-2	B-17	SM	A-2-4	G-14	B-3	SM	A-2-4
G-3	B-12	SM	A-2-4	G-15	B-3	SP	A-1-b
G-4	B-6	SM	A-2-4	G-16	B-4	SP	A-1-b
G-5	B-5	SM	A-2-4	G-17	B-6	SP	A-1-b
G-6	B-9	ML	A-4	G-18	B-9	SP	A-1-b
G-7	B-7	SM	A-2-4	G-19	B-10	SM	A-2-4
G-8	B-12	SM	A-2-4	G-20	B-12	SP	A-1-b
G-9	B-16	SM	A-2-4	G-21	B-12	SP	A-1-b
G-10	B-8	SM	A-2-4	G-22	B-13	SM	A-2-4
G-11	B-11	SM	A-2-4	G-23	B-13	SP	A-1-b
G-12	B-1	SM	A-2-4	G-24	B-16	SP	A-1-b

These test results are included in Appendix 3. No moisture content tests were conducted per SEH's instructions.



## **C. Engineering Review**

### **Discussion:**

Based on our findings, the soils encountered on this site appear to be fairly well suited for the proposed utility installation and street construction. Some softer soils were encountered during our exploration in the area of borings B-6, B-7, B-10, B-11, B-15, B-19, and B-22. If standard compaction techniques are used during construction, these existing soils can be recompacted to support the proposed utility structures and street section. The existing groundwater conditions will have an impact on project design and construction, depending on site grading and utility depths.

## **D. Closing**

Our work was performed for geotechnical purposes only and not to document the presence or extent of any contamination on the site. We can note that our crew did not detect any obvious contamination by sight or smell during drilling operations. However, human senses are limited in terms of contamination detection and, therefore, the lack of detection through human sensing does not preclude the possibility of the presence of contamination of the site.

This report represents the result of our subsurface investigation and is based on information gathered at specific locations. Subsurface conditions can change a great deal over short horizontal distances. Also, the actual interface between strata will likely be a gradual transition rather than an abrupt change as represented on the boring logs.

Geotechnical engineering is based extensively on opinion. Therefore, the data contained in this report should be used as a guide, and we recommend that construction monitoring be performed by a qualified geotechnical engineer or technician. Any changes in the

February 20, 2003  
Project 02-543  
Northeast Industrial Park  
Cambridge, Minnesota

subsurface conditions from those found during our subsurface investigation should be brought to the attention of a soils engineer.

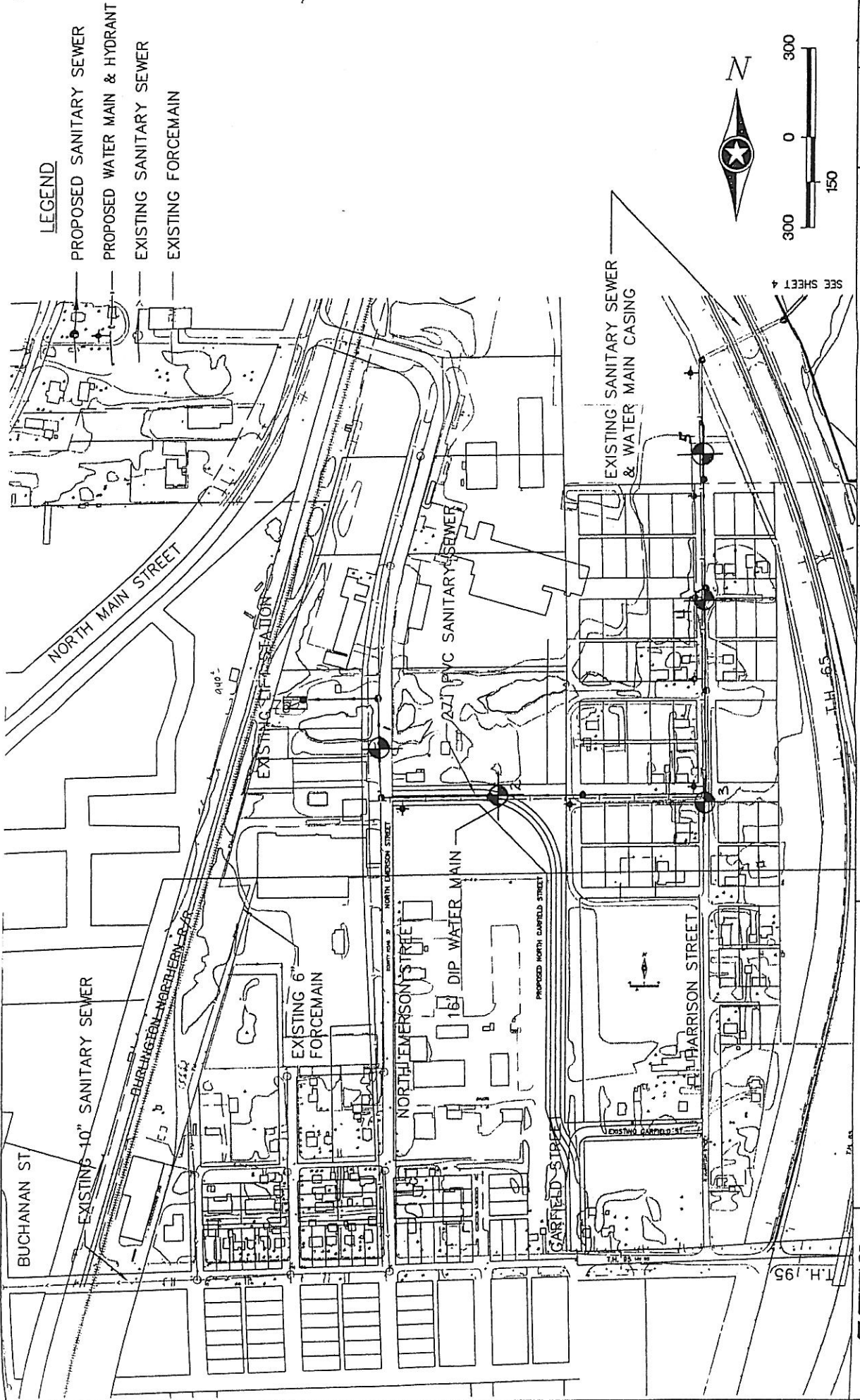
c:b2543-rpt




# APPENDIX 1

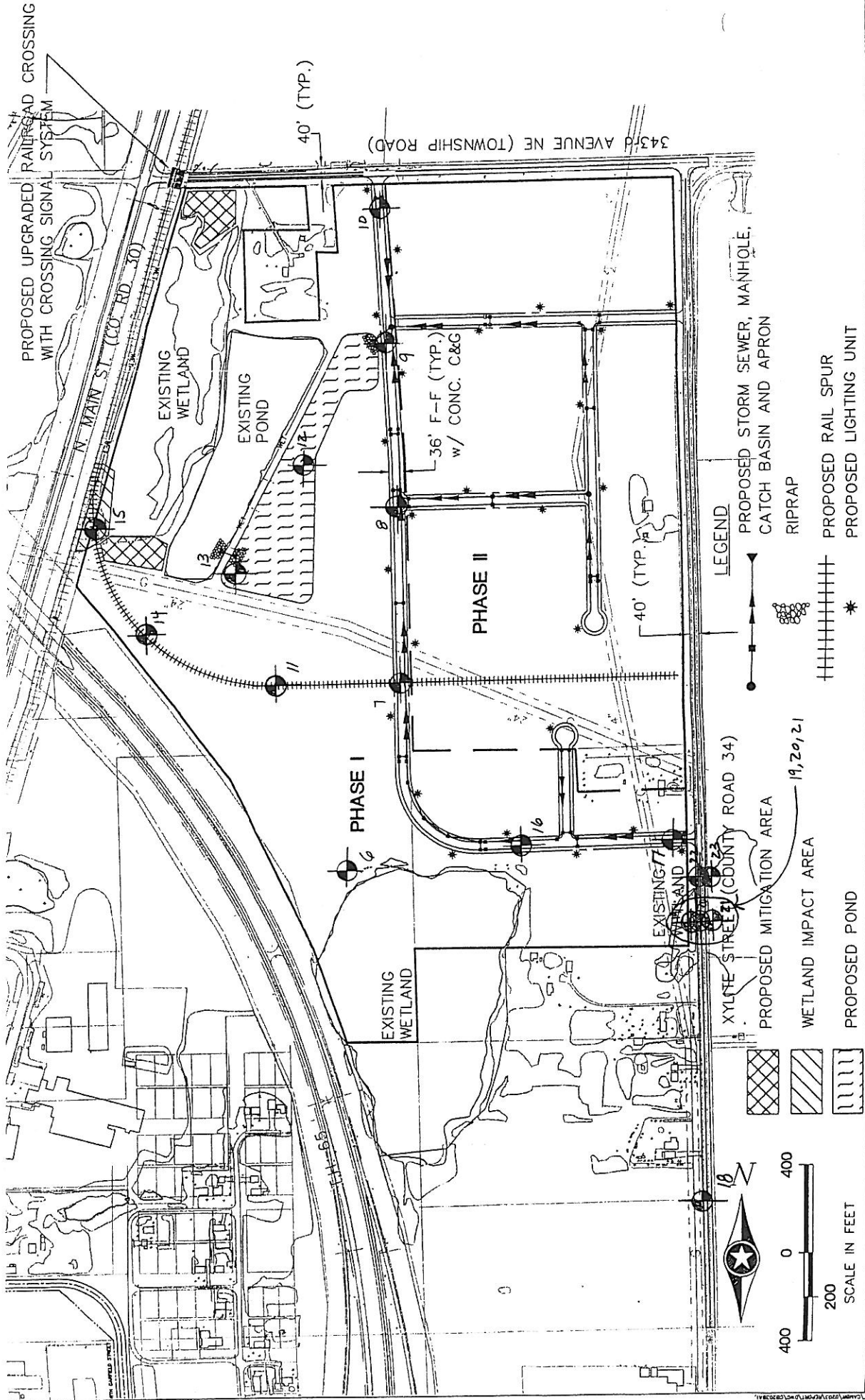
## BORING LOCATION PLAN

# BORING LOCATION PLAN



 <p>SEA PHONE: (612) 490-2000 FAX: (612) 490-2000 ST. PAUL, MN 55102</p>	CITY PROJECT NO. 02-02 NORTHEAST INDUSTRIAL PARK		SANITARY SEWER AND WATER MAIN - PHASE I		FILE NO. A-CAMBR0203.00	3	5
	CAMBRIDGE MINNESOTA				DATE: 9/16/02		

# BORING LOCATION PLAN



APPENDIX 2

SOIL BORING LOGS

# INDEPENDENT TESTING TECHNOLOGIES, INC.

# LOG OF SOIL BORING

PROJECT: 02-543 CITY OF CAMBRIDGE DATE: 1-30-03 BORING #: **B-1**  
 NORTHEAST INDUSTRIAL PARK START TIME: 11:53 END TIME: 12:20  
 CAMBRIDGE, MINNESOTA

LOCATION: See Boring Location Plan METHOD: 3 1/4" I.D. Hollow Stem Auger  
 CREW: RB / CKA  
 ELEVATION: Not Given

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
11"		4" Bituminous, 7" Aggregate Base				
4.5	SM	SILTY SAND, fine grained, w/ a trace of GRAVEL, brown.	1	*		*Frozen soil. No sample recovery.
9.0	SP-SM	POORLY GRADED SAND w/ SILT, fine grained, w/ a trace of GRAVEL, brown, mottled.	2	14		
			3	7		
15.0	SP	POORLY GRADED SAND, fine grained, w/ a trace of GRAVEL, brown, mottled.	4	13	<u>V</u>	Water encountered at 10 feet.
		Changes to grey and water-bearing at 12 1/2 feet.	5	7		
			6	5		
21.5			7	9		
		Boring complete to 21 1/2 feet. Water encountered at 10 feet during drilling.				

## INDEPENDENT TESTING TECHNOLOGIES, INC.

## LOG OF SOIL BORING

PROJECT: 02-543 CITY OF CAMBRIDGE  
NORTHEAST INDUSTRIAL PARK  
CAMBRIDGE, MINNESOTA

DATE: 1-30-03 BORING #: B-2  
START TIME: 1:47 END TIME: 2:35

LOCATION: See Boring Location Plan

METHOD: 3 1/4" I.D. Hollow Stem Auger  
CREW: RB / CKA  
ELEVATION: Not Given

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
8"	SM	SILTY SAND, black - Topsoil.				
4.5	SP-SM	POORLY GRADED SAND w/ SILT, fine grained, w/ a trace of GRAVEL, brown, mottled.	1	17		
10.0	SP	POORLY GRADED SAND, fine grained, w/ a trace of GRAVEL, brown, mottled.	2	15		
			3	10		
			4	8		
15.0			5	18		
			6	17		
20.0			7	32		
25.0			8	12		
31.5		Boring complete to 31 1/2 feet. No water encountered during drilling.	9	7		

# INDEPENDENT TESTING TECHNOLOGIES, INC.

# LOG OF SOIL BORING

PROJECT: 02-543 CITY OF CAMBRIDGE  
NORTHEAST INDUSTRIAL PARK  
CAMBRIDGE, MINNESOTA

DATE: 1-28-03 BORING #: **B-3**  
START TIME: 2:46 END TIME: 3:24

METHOD: 3 1/4" I.D. Hollow Stem Auger  
CREW: RB / CKA  
ELEVATION: Not Given

LOCATION: See Boring Location Plan

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
8"	SM	SILTY SAND, black - Topsoil.				
	SM	SILTY SAND, fine grained, w/ a trace of GRAVEL, brown.				
2.5						
	SP-SM	POORLY GRADED SAND w/ SILT, fine grained, w/ a trace of GRAVEL, brown.	1	*		*Frozen soil. No sample recovery.
6.5			2	13		
	SP	POORLY GRADED SAND, fine grained, w/ a trace of GRAVEL, brown.	3	8		
10.0			4	7		
			5	17		
15.0			6	23	<u>V</u>	Water encountered at 14 feet.
			7	14		
20.0						
			8	30		
26.5						
		Boring complete to 26 1/2 feet. Water encountered at 14 feet during drilling.				

## INDEPENDENT TESTING TECHNOLOGIES, INC.

## LOG OF SOIL BORING

PROJECT: 02-543 CITY OF CAMBRIDGE  
NORTHEAST INDUSTRIAL PARK  
CAMBRIDGE, MINNESOTA

DATE: 1-28-03 BORING #: B-4  
START TIME: 3:40 END TIME: 4:17

LOCATION: See Boring Location Plan

METHOD: 3 1/4" I.D. Hollow Stem Auger  
CREW: RB / CKA  
ELEVATION: Not Given

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
18"	SM	SILTY SAND, black - Topsoil.				
5.0	SM	SILTY SAND, fine grained, w/ a trace of GRAVEL, brown.	1	*		*Frozen soil. No sample recovery.
			2	14		
9.0			3	12		
15.0	SP	POORLY GRADED SAND, fine grained, w/ a trace of GRAVEL, brown.	4	11	<u>V</u>	Water encountered at 11 feet.
			5	13		
			6	18		
20.0			7	45		
26.5			8	16		
		Boring complete to 26 1/2 feet. Water encountered at 11 feet during drilling.				



## INDEPENDENT TESTING TECHNOLOGIES, INC.

## LOG OF SOIL BORING

PROJECT: 02-543 CITY OF CAMBRIDGE  
NORTHEAST INDUSTRIAL PARK  
CAMBRIDGE, MINNESOTA

DATE: 1-28-03 BORING #: B-5  
START TIME: 8:15 END TIME: 8:48

LOCATION: See Boring Location Plan

METHOD: 3 1/4" I.D. Hollow Stem Auger  
CREW: RB / CKA  
ELEVATION: Not Given

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
10"	SM	SILTY SAND, black - Topsoil.				
5.0	SM	SILTY SAND, fine grained, w/ a trace of GRAVEL, brown.	1	21*		*Frozen soil.
10.0	SP	POORLY GRADED SAND, fine grained, w/ a trace of GRAVEL, brown.	2	12		
			3	13		
			4	8		
15.0			5	13	<u>Y</u>	Water encountered at 13 1/2 feet.
			6	15		
21.5			7	9		
		Boring complete to 21 1/2 feet. Water encountered at 13 1/2 feet during drilling.				

# INDEPENDENT TESTING TECHNOLOGIES, INC. LOG OF SOIL BORING

PROJECT: 02-543 CITY OF CAMBRIDGE  
 NORTHEAST INDUSTRIAL PARK  
 CAMBRIDGE, MINNESOTA

DATE: 1-27-03 BORING #: B-6  
 START TIME: 12:19 END TIME: 12:42

LOCATION: See Boring Location Plan

METHOD: 3 1/4" I.D. Hollow Stem Auger  
 CREW: RB / CKA  
 ELEVATION: Not Given

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
12"	SM	SILTY SAND, black - Topsoil.				
3.0	SM	SILTY SAND, fine grained, w/ a trace of GRAVEL, brown.				
3.5	ML	SILT, fine grained, w/ a trace of GRAVEL, brown, heavily mottled.	1	7		
	SM	SILTY SAND, fine grained, w/ a trace of GRAVEL, brown.				
6.5			2	17	<u>Y</u>	Water encountered at 6 1/2 feet.
	SP	POORLY GRADED SAND, fine to medium grained, w/ a trace of GRAVEL, brown.				
		Changes to grey at 9 feet.	3	4		
			4	4		
			5	8		
16.5			6	5		
		Boring complete to 16 1/2 feet. Water encountered at 6 1/2 feet during drilling.				

## INDEPENDENT TESTING TECHNOLOGIES, INC.

## LOG OF SOIL BORING

PROJECT: 02-543 CITY OF CAMBRIDGE  
NORTHEAST INDUSTRIAL PARK  
CAMBRIDGE, MINNESOTA

DATE: 1-27-03 BORING #: B-7  
START TIME: 12:52 END TIME: 1:17

LOCATION: See Boring Location Plan

METHOD: 3 1/4" I.D. Hollow Stem Auger  
CREW: RB / CKA  
ELEVATION: Not Given

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
16"	SM	SILTY SAND, black - Topsoil.				
6.0	SP-SM	POORLY GRADED SAND w/ SILT, fine grained, w/ a trace of GRAVEL, brown.  Wet at 5 feet.	1	*		*Frozen soil. No sample recovery.
			2	8		
10.0	SP	POORLY GRADED SAND, fine grained, w/ a trace of GRAVEL, brown.	3	9		
			4	8		
15.0			5	12		
			6	15	<u>Y</u>	Water encountered at 16 feet.
21.5			7	4		
		Boring complete to 21 1/2 feet. Water encountered at 16 feet during drilling.				

## INDEPENDENT TESTING TECHNOLOGIES, INC.

## LOG OF SOIL BORING

PROJECT: 02-543 CITY OF CAMBRIDGE  
NORTHEAST INDUSTRIAL PARK  
CAMBRIDGE, MINNESOTA

DATE: 1-27-03 BORING #: B-8  
START TIME: 1:25 END TIME: 1:50

LOCATION: See Boring Location Plan

METHOD: 3 1/4" I.D. Hollow Stem Auger  
CREW: RB / CKA  
ELEVATION: Not Given

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
8"	SM	SILTY SAND, black - Topsoil.				
3.0	SP-SM	POORLY GRADED SAND w/ SILT, fine grained, w/ a trace of GRAVEL, brown.				
4.0	SC-SM	SILTY CLAYEY SAND, fine grained, w/ a trace of GRAVEL, brown.	1	*		*Frozen soil. No sample recovery.
9.0	SP-SM	POORLY GRADED SAND w/ SILT, fine grained, w/ a trace of GRAVEL, brown.	2	10		
			3	17		
15.0	SP	POORLY GRADED SAND, fine grained, w/ a trace of GRAVEL, brown.	4	20		
			5	33		
			6	20		
21.5			7	25		
		Boring complete to 21 1/2 feet. No water encountered during drilling.				

# INDEPENDENT TESTING TECHNOLOGIES, INC.

# LOG OF SOIL BORING

PROJECT: 02-543 CITY OF CAMBRIDGE  
NORTHEAST INDUSTRIAL PARK  
CAMBRIDGE, MINNESOTA

DATE: 1-27-03 BORING #: B-9  
START TIME: 1:56 END TIME: 2:20

LOCATION: See Boring Location Plan

METHOD: 3 1/4" I.D. Hollow Stem Auger  
CREW: RB / CKA  
ELEVATION: Not Given

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
11"	SM	SILTY SAND, black - Topsoil.				
5.0	SM	SILTY SAND, fine grained, w/ a trace of GRAVEL, brown.	1	7		
			2	9		
8.0	SP	POORLY GRADED SAND, fine grained, w/ a trace of GRAVEL, brown.	3	5		
			4	22		
			5	23		
16.5			6	20		
		Boring complete to 16 1/2 feet. No water encountered during drilling.				

## INDEPENDENT TESTING TECHNOLOGIES, INC.

## LOG OF SOIL BORING

PROJECT: 02-543 CITY OF CAMBRIDGE  
NORTHEAST INDUSTRIAL PARK  
CAMBRIDGE, MINNESOTA

DATE: 1-27-03 BORING #: B-10  
START TIME: 2:28 END TIME: 2:43

LOCATION: See Boring Location Plan

METHOD: 3 1/4" I.D. Hollow Stem Auger  
CREW: RB / CKA  
ELEVATION: Not Given

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
30"	SM	SILTY SAND, black - Topsoil.				
3.5	SP	POORLY GRADED SAND, fine grained, w/ a trace of GRAVEL, brown.	1	7		
11.5	SM	SILTY SAND, fine grained, w/ a trace of GRAVEL, brown.	2	13	V	Water encountered at 6 1/2 feet.
			3	2		
			4	7		
		Boring complete to 11 1/2 feet. Water encountered at 6 1/2 feet during drilling.				

## INDEPENDENT TESTING TECHNOLOGIES, INC.

## LOG OF SOIL BORING

PROJECT: 02-543 CITY OF CAMBRIDGE  
NORTHEAST INDUSTRIAL PARK  
CAMBRIDGE, MINNESOTA

DATE: 1-28-03 BORING #: **B-11**  
START TIME: 2:48 END TIME: 3:08

LOCATION: See Boring Location Plan

METHOD: 3 1/4" I.D. Hollow Stem Auger  
CREW: RB / CKA  
ELEVATION: Not Given

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
18"	SM	SILTY SAND, black - Topsoil.				
5.0	SM	SILTY SAND, fine grained, w/ a trace of GRAVEL, brown.	1	13		
		Changes to mottled at 6 1/2 feet.	2	12		
			3	6		
11.5			4	4		
		Boring complete to 11 1/2 feet. No water encountered during drilling.				

# INDEPENDENT TESTING TECHNOLOGIES, INC.

# LOG OF SOIL BORING

PROJECT: 02-543 CITY OF CAMBRIDGE  
NORTHEAST INDUSTRIAL PARK  
CAMBRIDGE, MINNESOTA

DATE: 1-28-03 BORING #: B-12  
START TIME: 8:55 END TIME: 9:38

LOCATION: See Boring Location Plan

METHOD: 3 1/4" I.D. Hollow Stem Auger  
CREW: RB / CKA  
ELEVATION: Not Given

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
18"	SM	SILTY SAND, black - Topsoil.				
5.0	SP-SM	POORLY GRADED SAND w/ SILT, fine grained, w/ a trace of GRAVEL, brown.  Changes to mottled at 5 feet.	1	21		
10.0			2	12		
			3	10		
			4	12		
14.0			5	21		
	SP	POORLY GRADED SAND, fine grained, w/ a trace of GRAVEL, brown.	6	15		
20.0			7	23		
26.5			8	9		
		Boring complete to 26 1/2 feet. No water encountered during drilling.				



# INDEPENDENT TESTING TECHNOLOGIES, INC.

# LOG OF SOIL BORING

PROJECT: 02-543 CITY OF CAMBRIDGE  
NORTHEAST INDUSTRIAL PARK  
CAMBRIDGE, MINNESOTA

DATE: 1-28-03 BORING #: B-13  
START TIME: 9:50 END TIME: 10:25

LOCATION: See Boring Location Plan

METHOD: 3 1/4" I.D. Hollow Stem Auger  
CREW: RB / CKA  
ELEVATION: Not Given

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
12"	SM	SILTY SAND, black - Topsoil.				
5.0	SM	SILTY SAND, fine grained, w/ a trace of GRAVEL, brown.	1	33*		*Frozen soil.
9.0	SP-SM	POORLY GRADED SAND w/ SILT, fine grained, w/ a trace of GRAVEL, brown.	2	12		
			3	9		
15.0	SP	POORLY GRADED SAND, fine grained, w/ a trace of GRAVEL, brown.	4	18		
			5	20	<u>Y</u>	Water encountered at 12 feet.
		Changes to fine to medium grained at 15 feet.	6	8		
20.0			7	39		
26.5			8	15		
		Boring complete to 26 1/2 feet. Water encountered at 12 feet during drilling.				

# INDEPENDENT TESTING TECHNOLOGIES, INC.

# LOG OF SOIL BORING

PROJECT: 02-543 CITY OF CAMBRIDGE  
NORTHEAST INDUSTRIAL PARK  
CAMBRIDGE, MINNESOTA

DATE: 1-28-03 BORING #: B-14  
START TIME: 10:36 END TIME: 10:50

LOCATION: See Boring Location Plan

METHOD: 3 1/4" I.D. Hollow Stem Auger  
CREW: RB / CKA  
ELEVATION: Not Given

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
10"	SM	SILTY SAND, black - Topsoil.				
5.0	SP-SM	POORLY GRADED SAND w/ SILT, fine grained, w/ a trace of GRAVEL, brown.	1	19		
11.5	SP	POORLY GRADED SAND, fine grained, w/ a trace of GRAVEL, brown.	2	12		
			3	12		
			4	15		
		Boring complete to 11 1/2 feet. No water encountered during drilling.				

## INDEPENDENT TESTING TECHNOLOGIES, INC.

## LOG OF SOIL BORING

PROJECT: 02-543 CITY OF CAMBRIDGE  
NORTHEAST INDUSTRIAL PARK  
CAMBRIDGE, MINNESOTA

DATE: 1-28-03 BORING #: B-15  
START TIME: 8:45 END TIME: 9:35

LOCATION: See Boring Location Plan

METHOD: 3 1/4" I.D. Hollow Stem Auger  
CREW: RB / CKA  
ELEVATION: Not Given

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
	OL	ORGANIC SILT, fine grained, black.			<u>Y</u>	Water encountered at 1 foot.
5.0			1	3		
	SP-SM	POORLY GRADED SAND w/ SILT, fine grained, w/ a trace of GRAVEL, brown.	2	6		
8.0			3	8		
	SP	POORLY GRADED SAND, fine grained, w/ a trace of GRAVEL, brown.	4	12		
			5	4		
16.5			6	18		
		Boring complete to 16 1/2 feet. Water encountered at 1 foot during drilling.				

## INDEPENDENT TESTING TECHNOLOGIES, INC.

## LOG OF SOIL BORING

PROJECT: 02-543 CITY OF CAMBRIDGE  
NORTHEAST INDUSTRIAL PARK  
CAMBRIDGE, MINNESOTA

DATE: 1-28-03 BORING #: **B-16**  
START TIME: 9:50 END TIME: 10:14

LOCATION: See Boring Location Plan

METHOD: 3 1/4" I.D. Hollow Stem Auger  
CREW: RB / CKA  
ELEVATION: Not Given

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
16"	SM	SILTY SAND, black - Topsoil.				
6.5	SP-SM	POORLY GRADED SAND w/ SILT, fine grained, w/ a trace of GRAVEL, brown.  Changes to mottled at 5 feet.	1 2	* 8	 Y	*Frozen soil. No sample recovery.  Water encountered at 5 feet.
10.0	SP	POORLY GRADED SAND, fine grained, w/ a trace of GRAVEL, brown, mottled.	3 4 5 6	11 6 11 7		
16.5		Boring complete to 16 1/2 feet. Water encountered at 5 feet during drilling.				

# INDEPENDENT TESTING TECHNOLOGIES, INC.

# LOG OF SOIL BORING

PROJECT: 02-543 CITY OF CAMBRIDGE  
NORTHEAST INDUSTRIAL PARK  
CAMBRIDGE, MINNESOTA

DATE: 1-28-03 BORING #: B-17  
START TIME: 4:30 END TIME: 4:55

LOCATION: See Boring Location Plan

METHOD: 3 1/4" I.D. Hollow Stem Auger  
CREW: RB / CKA  
ELEVATION: Not Given

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
12"	SM	SILTY SAND, black - Topsoil.				
3.0	SM	SILTY SAND, fine grained, w/ a trace of GRAVEL, brown.				
10.0	SP	POORLY GRADED SAND, fine grained, w/ a trace of GRAVEL, brown.	1	*		*Frozen soil. No sample recovery.
			2	8		
			3	8		
			4	6		
			5	11		
16.5			6	11		
		Boring complete to 16 1/2 feet. Water encountered at 9 feet during drilling.				

# INDEPENDENT TESTING TECHNOLOGIES, INC.

# LOG OF SOIL BORING

PROJECT: 02-543 CITY OF CAMBRIDGE DATE: 1-28-03 BORING #: B-18  
 NORTHEAST INDUSTRIAL PARK START TIME: 11:00 END TIME: 11:21  
 CAMBRIDGE, MINNESOTA  
 LOCATION: See Boring Location Plan METHOD: 3 1/4" I.D. Hollow Stem Auger  
 CREW: RB / CKA  
 ELEVATION: Not Given

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
10"		6" Bituminous, 4" Aggregate Base				
5.0	SM	SILTY SAND, fine grained, w/ a trace of GRAVEL, brown.	1	*		*Frozen soil. No sample recovery.
11.5	SP	POORLY GRADED SAND, fine grained, w/ a trace of GRAVEL, brown.	2	11		
			3	9		
			4	7		
		Boring complete to 11 1/2 feet. No water encountered during drilling.				

# INDEPENDENT TESTING TECHNOLOGIES, INC. LOG OF SOIL BORING

PROJECT: 02-543 CITY OF CAMBRIDGE DATE: 1-30-03 BORING #: B-19  
 NORTHEAST INDUSTRIAL PARK START TIME: 11:15 END TIME: 11:40  
 CAMBRIDGE, MINNESOTA  
 LOCATION: See Boring Location Plan METHOD: 3 1/4" I.D. Hollow Stem Auger  
 CREW: RB / CKA  
 ELEVATION: Not Given

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
		Ice and water.			<u>V</u>	Water present at surface.
2.0						
	OL	ORGANIC SILT, fine grained, black.				
3.5			1	1		
	SP	POORLY GRADED SAND, fine grained, w/ a trace of GRAVEL, brown.				
			2	6		
			3	5		
10.0			4	1		
			5	3		
			6	7		
16.5						
		Boring complete to 16 1/2 feet. Water encountered at surface.				

## INDEPENDENT TESTING TECHNOLOGIES, INC.

## LOG OF SOIL BORING

PROJECT: 02-543 CITY OF CAMBRIDGE  
NORTHEAST INDUSTRIAL PARK  
CAMBRIDGE, MINNESOTA

DATE: 1-28-03 BORING #: B-20  
START TIME: 11:31 END TIME: 12:06

LOCATION: See Boring Location Plan - Moved 4' East of Planned Location

METHOD: 3 1/4" I.D. Hollow Stem Auger  
CREW: RB / CKA  
ELEVATION: Not Given

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
12"		8" Bituminous, 4" Aggregate Base				
6.5	SM	SILTY SAND, fine grained, dark brown - Fill.	1	*		*Frozen soil. No sample recovery.
			2	5		
9.0	SP	POORLY GRADED SAND, fine grained, w/ a trace of GRAVEL, grey.	3	6	Y	Water encountered at 7 feet.
	SP-SM	POORLY GRADED SAND w/ SILT, fine grained, w/ a trace of GRAVEL, grey.	4	8		
13.5			5	9		
	SP	POORLY GRADED SAND, fine grained, w/ a trace of GRAVEL, grey.	6	7		
21.5			7	9		
		Boring complete to 21 1/2 feet. Water encountered at 7 feet during drilling.				



## INDEPENDENT TESTING TECHNOLOGIES, INC.

## LOG OF SOIL BORING

PROJECT: 02-543 CITY OF CAMBRIDGE  
NORTHEAST INDUSTRIAL PARK  
CAMBRIDGE, MINNESOTA

DATE: 1-28-03 BORING #: B-22  
START TIME: 12:13 END TIME: 12:30

LOCATION: See Boring Location Plan

METHOD: 3 1/4" I.D. Hollow Stem Auger  
CREW: RB / CKA  
ELEVATION: Not Given

Depth (Feet)	ASTM Symbol	Soil Description	Sample #	N Value	Water Table	Notes
11"		8" Bituminous, 3" Aggregate Base				
5.0	SM	SILTY SAND, fine grained, w/ a trace of GRAVEL, brown.	1	*		*Frozen soil. No sample recovery.
6.5	OL	ORGANIC SILT, fine grained, black.	2	4	<u>Y</u>	Water encountered at 6 feet.
10.0	SP	POORLY GRADED SAND, fine grained, w/ a trace of GRAVEL, grey.	3	8		
			4	8		
15.0			5	6		
			6	4		
21.5			7	11		
		Boring complete to 21 1/2 feet. Water encountered at 6 feet during drilling.				



337 31ST AVENUE SOUTH • P.O. BOX 325 • WAITE PARK, MN 56387  
Phone: (320) 253-4338 • Fax: (320) 253-4547


February 20, 2003  
I.T.T. Project #02-543  
SEH, Inc.  
Northeast Industrial Park  
Cambridge, Minnesota  
Boring Date: January 30, 2003

### **Visual Classifications:**

<b>Hand Auger #1:</b>	<u>Depth</u>	<u>Classification</u>
(B-21)	0'-2'	OL ORGANIC SILT, fine grained, black.
	2'-10'	SP POORLY GRADED SAND, fine grained, with a trace of GRAVEL, grey, water bearing.

<b>Hand Auger #2:</b>	<u>Depth</u>	<u>Classification</u>
(B-23)	0'-1.5'	OL ORGANIC SILT, fine grained, black.
	1.5'-10'	SP POORLY GRADED SAND, fine grained, with a trace of GRAVEL, grey, water bearing.

Submitted By:

  
\_\_\_\_\_  
Wayne C. B. Stark, P.E.  
Geotechnical Division Manager

c:b2543-ha

## APPENDIX 3

# LABORATORY TESTING RESULTS

Independent Testing Technologies, Inc.  
P.O. Box 325, Waite Park, MN 56387  
Phone: (320) 253-4338  
Fax: (320) 253-4547

## GRAIN SIZE ANALYSIS

Date: February 11, 2003      Project: 02-543      Northeast Industrial Park  
Client: City of Cambridge      Cambridge, Minnesota  
cc: SEH, Inc - St. Paul      Technician: CW

---

Sample Information:

Sample #:	G-1
Sampled By:	RB
Date Sampled:	1-28-03
Date Received:	1-28-03
Date Tested:	2-6-03
Location:	Boring B-4, Sample 1

Laboratory Data:	<u>Sieve Size</u>	<u>% Passing</u>
	1"	100
	3/4"	100
	5/8"	100
	1/2"	100
	3/8"	100
	#4	100
	#10	100
	#20	99
	#40	96
	#80	73
	#200	20.7

Classification:      ASTM:      SM Silty Sand, fine grained, w/ a trace of Gravel, brown.  
AASHTO: A-2-4

Respectfully Submitted:

  
Wayne C.B. Stark, Geotechnical Division Manager

**Independent Testing Technologies, Inc.**  
P.O. Box 325, Waite Park, MN 56387  
Phone: (320) 253-4338  
Fax: (320) 253-4547

## GRAIN SIZE ANALYSIS

Date: February 11, 2003      Project: 02-543      Northeast Industrial Park  
Cambridge, Minnesota  
Client: City of Cambridge  
cc: SEH, Inc - St. Paul      Technician: CW

---

**Sample Information:**

Sample #:	G-2
Sampled By:	CKA
Date Sampled:	1-28-03
Date Received:	1-28-03
Date Tested:	2-6-03
Location:	Boring B-17, Sample 1

<b>Laboratory Data:</b>	<u>Sieve Size</u>	<u>% Passing</u>
	1"	100
	3/4"	100
	5/8"	100
	1/2"	100
	3/8"	100
	#4	100
	#10	100
	#20	100
	#40	98
	#80	84
	#200	35.4

**Classification:**      ASTM:      SM Silty Sand, fine grained, w/ a trace of Gravel, brown.  
AASHTO: A-2-4

Respectfully Submitted:

  
Wayne C.B. Stark, Geotechnical Division Manager

**Independent Testing Technologies, Inc.**  
P.O. Box 325, Waite Park, MN 56387  
Phone: (320) 253-4338  
Fax: (320) 253-4547

## GRAIN SIZE ANALYSIS

Date: February 11, 2003      Project: 02-543      Northeast Industrial Park  
Cambridge, Minnesota  
Client: City of Cambridge  
cc: SEH, Inc - St. Paul      Technician: CW

---

**Sample Information:**

Sample #:	G-3
Sampled By:	CKA
Date Sampled:	1-28-03
Date Received:	1-28-03
Date Tested:	2-6-03
Location:	Boring B-12, Sample 3

<b>Laboratory Data:</b>	<u>Sieve Size</u>	<u>% Passing</u>
	1"	100
	3/4"	100
	5/8"	100
	1/2"	100
	3/8"	100
	#4	100
	#10	100
	#20	99
	#40	96
	#80	78
	#200	18.4

**Classification:**      ASTM:      SM Silty Sand, fine grained, w/ a trace of Gravel, brown.  
AASHTO: A-2-4

Respectfully Submitted:

  
Wayne C.B. Stark, Geotechnical Division Manager

**Independent Testing Technologies, Inc.**  
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Phone: (320) 253-4338  
Fax: (320) 253-4547

## GRAIN SIZE ANALYSIS

Date: February 11, 2003      Project: 02-543      Northeast Industrial Park  
Cambridge, Minnesota  
Client: City of Cambridge  
cc: SEH, Inc - St. Paul      Technician: CW

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**Sample Information:**

Sample #:	G-4
Sampled By:	CKA
Date Sampled:	1-28-03
Date Received:	1-28-03
Date Tested:	2-6-03
Location:	Boring B-6, Sample 3

<b>Laboratory Data:</b>	<u>Sieve Size</u>	<u>% Passing</u>
	1"	100
	3/4"	100
	5/8"	100
	1/2"	100
	3/8"	100
	#4	100
	#10	100
	#20	99
	#40	97
	#80	79
	#200	23.4

**Classification:**      ASTM:      SM Silty Sand, fine grained, w/ a trace of Gravel, brown.  
AASHTO: A-2-4

Respectfully Submitted:

  
Wayne C.B. Stark, Geotechnical Division Manager

**Independent Testing Technologies, Inc.**  
**P.O. Box 325, Waite Park, MN 56387**  
**Phone: (320) 253-4338**  
**Fax: (320) 253-4547**

## **GRAIN SIZE ANALYSIS**

Date: February 11, 2003      Project: 02-543      Northeast Industrial Park  
Cambridge, Minnesota  
Client: City of Cambridge  
cc: SEH, Inc - St. Paul      Technician: CW

---

**Sample Information:**

Sample #:	G-5
Sampled By:	RB
Date Sampled:	1-30-03
Date Received:	1-30-03
Date Tested:	2-6-03
Location:	Boring B-5, Sample 2

<b>Laboratory Data:</b>	<u>Sieve Size</u>	<u>% Passing</u>
	1"	100
	3/4"	100
	5/8"	100
	1/2"	100
	3/8"	100
	#4	100
	#10	100
	#20	99
	#40	96
	#80	83
	#200	27.6

**Classification:**      ASTM:      SM Silty Sand, fine grained, w/ a trace of Gravel, brown.  
AASHTO: A-2-4

Respectfully Submitted:

  
Wayne C.B. Stark, Geotechnical Division Manager



**Independent Testing Technologies, Inc.**  
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## GRAIN SIZE ANALYSIS

Date: February 11, 2003      Project: 02-543      Northeast Industrial Park  
Cambridge, Minnesota  
Client: City of Cambridge  
cc: SEH, Inc - St. Paul      Technician: CW

---

**Sample Information:**

Sample #:	G-6
Sampled By:	RB
Date Sampled:	1-30-03
Date Received:	1-30-03
Date Tested:	2-6-03
Location:	Boring B-9, Sample 2

<b>Laboratory Data:</b>	<u>Sieve Size</u>	<u>% Passing</u>
	1"	100
	3/4"	100
	5/8"	100
	1/2"	100
	3/8"	100
	#4	100
	#10	100
	#20	99
	#40	98
	#80	89
	#200	38.0

**Classification:**      ASTM:      ML SILT, fine grained, brown  
AASHTO:      A-4

Respectfully Submitted:

  
Wayne C.B. Stark, Geotechnical Division Manager

**Independent Testing Technologies, Inc.**  
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Fax: (320) 253-4547

## GRAIN SIZE ANALYSIS

Date: February 11, 2003      Project: 02-543      Northeast Industrial Park  
Cambridge, Minnesota  
Client: City of Cambridge  
cc: SEH, Inc - St. Paul      Technician: CW

---

**Sample Information:**

Sample #:	G-7
Sampled By:	RB
Date Sampled:	1-30-03
Date Received:	1-30-03
Date Tested:	2-6-03
Location:	Boring B-7, Sample 3

<b>Laboratory Data:</b>	<u>Sieve Size</u>	<u>% Passing</u>
	1"	100
	3/4"	100
	5/8"	100
	1/2"	100
	3/8"	100
	#4	100
	#10	100
	#20	99
	#40	97
	#80	76
	#200	22.6

**Classification:**      ASTM:      SM SILTY SAND, fine grained, w/ a trace of Gravel, brown.  
AASHTO: A-2-4

Respectfully Submitted:

  
Wayne C.B. Stark, Geotechnical Division Manager

**Independent Testing Technologies, Inc.**  
P.O. Box 325, Waite Park, MN 56387  
Phone: (320) 253-4338  
Fax: (320) 253-4547

## GRAIN SIZE ANALYSIS

Date: February 11, 2003      Project: 02-543      Northeast Industrial Park  
Cambridge, Minnesota  
Client: City of Cambridge  
cc: SEH, Inc - St. Paul      Technician: CW

---

**Sample Information:**

Sample #:	G-8
Sampled By:	RB
Date Sampled:	1-30-03
Date Received:	1-30-03
Date Tested:	2-7-03
Location:	Boring B-12, Sample 1

<b>Laboratory Data:</b>	<u>Sieve Size</u>	<u>% Passing</u>
	1"	100
	3/4"	100
	5/8"	100
	1/2"	100
	3/8"	100
	#4	100
	#10	100
	#20	99
	#40	96
	#80	71
	#200	12.1

**Classification:**      ASTM:      SM Silty Sand, fine grained, w/ a trace of Gravel, brown.  
AASHTO: A-2-4

Respectfully Submitted:

  
Wayne C. Stark, Geotechnical Division Manager

**Independent Testing Technologies, Inc.**  
**P.O. Box 325, Waite Park, MN 56387**  
**Phone: (320) 253-4338**  
**Fax: (320) 253-4547**

## GRAIN SIZE ANALYSIS

Date: February 11, 2003      Project: 02-543      Northeast Industrial Park  
Cambridge, Minnesota  
Client: City of Cambridge  
cc: SEH, Inc - St. Paul      Technician: CW

---

**Sample Information:**

Sample #:	G-9
Sampled By:	CKA
Date Sampled:	1-30-03
Date Received:	1-30-03
Date Tested:	2-7-03
Location:	Boring B-16, Sample 2

<b>Laboratory Data:</b>	<u>Sieve Size</u>	<u>% Passing</u>
	1"	100
	3/4"	100
	5/8"	100
	1/2"	100
	3/8"	100
	#4	100
	#10	100
	#20	99
	#40	95
	#80	77
	#200	24.0

**Classification:**      ASTM:      SM SILTY SAND, fine grained, w/ a trace of Gravel, brown.  
AASHTO: A-2-4

Respectfully Submitted:

  
Wayne C.B. Stark, Geotechnical Division Manager

**Independent Testing Technologies, Inc.**  
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Fax: (320) 253-4547

## GRAIN SIZE ANALYSIS

Date: February 11, 2003      Project: 02-543      Northeast Industrial Park  
Cambridge, Minnesota  
Client: City of Cambridge  
cc: SEH, Inc - St. Paul      Technician: CW

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**Sample Information:**

Sample #:	G-10
Sampled By:	RB
Date Sampled:	1-30-03
Date Received:	1-30-03
Date Tested:	2-7-03
Location:	Boring B-8, Sample 3

<b>Laboratory Data:</b>	<u>Sieve Size</u>	<u>% Passing</u>
	1"	100
	3/4"	100
	5/8"	100
	1/2"	100
	3/8"	100
	#4	100
	#10	100
	#20	99
	#40	97
	#80	85
	#200	35.0

**Classification:**      ASTM:      SM SILTY SAND, fine grained, w/ a trace of Gravel, brown.  
AASHTO: A-2-4

Respectfully Submitted:

  
Wayne C.B. Stark, Geotechnical Division Manager

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## GRAIN SIZE ANALYSIS

Date: February 11, 2003      Project: 02-543      Northeast Industrial Park  
Cambridge, Minnesota  
Client: City of Cambridge  
cc: SEH, Inc - St. Paul      Technician: CW

---

**Sample Information:**

Sample #:	G-11
Sampled By:	RB
Date Sampled:	1-30-03
Date Received:	1-30-03
Date Tested:	2-7-03
Location:	Boring B-11, Sample 3

<b>Laboratory Data:</b>	<u>Sieve Size</u>	<u>% Passing</u>
	1"	100
	3/4"	100
	5/8"	100
	1/2"	100
	3/8"	100
	#4	100
	#10	100
	#20	98
	#40	96
	#80	83
	#200	23.9

**Classification:**      ASTM:      SM SILTY SAND, fine grained, w/ a trace of Gravel, brown.  
AASHTO: A-2-4

Respectfully Submitted:



Wayne C.B. Stark, Geotechnical Division Manager

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## GRAIN SIZE ANALYSIS

Date: February 11, 2003      Project: 02-543      Northeast Industrial Park  
Cambridge, Minnesota  
Client: City of Cambridge  
cc: SEH, Inc - St. Paul      Technician: CW

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**Sample Information:**

Sample #:	G-12
Sampled By:	CKA
Date Sampled:	1-30-03
Date Received:	1-30-03
Date Tested:	2-7-03
Location:	Boring B-1, Sample 2

<b>Laboratory Data:</b>	<u>Sieve Size</u>	<u>% Passing</u>
	1"	100
	3/4"	100
	5/8"	100
	1/2"	100
	3/8"	100
	#4	100
	#10	100
	#20	98
	#40	95
	#80	73
	#200	22.9

**Classification:**      ASTM:      SM SILTY SAND, fine grained, w/ a trace of Gravel, brown.  
AASHTO: A-2-4

Respectfully Submitted:

  
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## GRAIN SIZE ANALYSIS

Date: February 20, 2003      Project: 02-543      Northeast Industrial Park  
Cambridge, Minnesota  
Client: City of Cambridge  
cc: SEH, Inc - St. Paul      Technician: CW

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**Sample Information:**

Sample #:	G-13
Sampled By:	CKA
Date Sampled:	1-30-03
Date Received:	1-30-03
Date Tested:	2-18-03
Location:	Boring B-1, Sample 6

<b>Laboratory Data:</b>	<u>Sieve Size</u>	<u>% Passing</u>
	1"	100
	3/4"	100
	5/8"	100
	1/2"	100
	3/8"	100
	#4	100
	#10	92
	#20	86
	#40	47
	#80	27
	#200	12.4

**Classification:**      ASTM:      SP Poorly Graded Sand, fine grained, w/ a trace of Gravel, brown.  
AASHTO:      A-1-b

Respectfully Submitted:

  
Wayne C.B. Stark, Geotechnical Division Manager



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## GRAIN SIZE ANALYSIS

Date: February 20, 2003      Project: 02-543      Northeast Industrial Park  
Cambridge, Minnesota  
Client: City of Cambridge  
cc: SEH, Inc - St. Paul      Technician: CW

---

**Sample Information:**

Sample #:	G-14
Sampled By:	CKA
Date Sampled:	1-28-03
Date Received:	1-28-03
Date Tested:	2-18-03
Location:	Boring B-3, Sample 4

<b>Laboratory Data:</b>	<u>Sieve Size</u>	<u>% Passing</u>
	1"	100
	3/4"	100
	5/8"	100
	1/2"	100
	3/8"	100
	#4	100
	#10	100
	#20	97
	#40	90
	#80	68
	#200	18.8

**Classification:**      ASTM:      SM Silty Sand, fine grained, w/ a trace of Gravel, brown.  
AASHTO: A-2-4

Respectfully Submitted:

  
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**GRAIN SIZE ANALYSIS**

Date: February 20, 2003      Project: 02-543      Northeast Industrial Park  
Cambridge, Minnesota  
Client: City of Cambridge  
cc: SEH, Inc - St. Paul      Technician: CW

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**Sample Information:**  
Sample #: G-15  
Sampled By: CKA  
Date Sampled: 1-28-03  
Date Received: 1-28-03  
Date Tested: 2-18-03  
Location: Boring B-3, Sample 7

<b>Laboratory Data:</b>	<u>Sieve Size</u>	<u>% Passing</u>
	1"	100
	3/4"	100
	5/8"	100
	1/2"	100
	3/8"	100
	#4	100
	#10	98
	#20	90
	#40	49
	#80	36
	#200	14.2

**Classification:**      ASTM:      SP Poorly Graded Sand, fine grained, w/ a trace of Gravel, brown.  
AASHTO: A-1-b

Respectfully Submitted:

  
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## GRAIN SIZE ANALYSIS

Date: February 20, 2003      Project: 02-543 Northeast Industrial Park  
Cambridge, Minnesota  
Client: City of Cambridge  
cc: SEH, Inc - St. Paul      Technician: CW

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**Sample Information:**

Sample #:	G-16
Sampled By:	RB
Date Sampled:	1-28-03
Date Received:	1-28-03
Date Tested:	2-18-03
Location:	Boring B-4, Sample 6

<b>Laboratory Data:</b>	<u>Sieve Size</u>	<u>% Passing</u>
	1"	100
	3/4"	100
	5/8"	100
	1/2"	100
	3/8"	100
	#4	100
	#10	97
	#20	88
	#40	45
	#80	34
	#200	15.7

**Classification:**      ASTM:      SP Poorly Graded Sand, fine grained, w/ a trace of Gravel, brown.  
AASHTO: A-1-b

Respectfully Submitted:

  
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## GRAIN SIZE ANALYSIS

Date: February 20, 2003      Project: 02-543      Northeast Industrial Park  
Cambridge, Minnesota  
Client: City of Cambridge  
cc: SEH, Inc - St. Paul      Technician: CW

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**Sample Information:**

Sample #:	G-17
Sampled By:	CKA
Date Sampled:	1-28-03
Date Received:	1-28-03
Date Tested:	2-18-03
Location:	Boring B-6, Sample 6

<b>Laboratory Data:</b>	<u>Sieve Size</u>	<u>% Passing</u>
	1"	100
	3/4"	100
	5/8"	100
	1/2"	100
	3/8"	100
	#4	100
	#10	96
	#20	87
	#40	44
	#80	31
	#200	14.3

**Classification:**      ASTM:      SP Poorly Graded Sand, fine grained, w/ a trace of Gravel, brown.  
AASHTO: A-1-b

Respectfully Submitted:

  
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## GRAIN SIZE ANALYSIS

Date: February 20, 2003      Project: 02-543      Northeast Industrial Park  
Cambridge, Minnesota  
Client: City of Cambridge  
cc: SEH, Inc - St. Paul      Technician: CW

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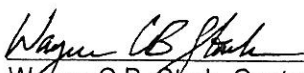
**Sample Information:**

Sample #:	G-18
Sampled By:	RB
Date Sampled:	1-30-03
Date Received:	1-30-03
Date Tested:	2-18-03
Location:	Boring B-9, Sample 5

<b>Laboratory Data:</b>	<u>Sieve Size</u>	<u>% Passing</u>
	1"	100
	3/4"	100
	5/8"	100
	1/2"	100
	3/8"	100
	#4	100
	#10	97
	#20	89
	#40	46
	#80	29
	#200	13.3

**Classification:**      ASTM:      SP Poorly Graded Sand, fine grained, w/ a trace of Gravel, brown.  
AASHTO: A-1-b

Respectfully Submitted:

  
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## GRAIN SIZE ANALYSIS

Date: February 20, 2003      Project: 02-543      Northeast Industrial Park  
Cambridge, Minnesota  
Client: City of Cambridge  
cc: SEH, Inc - St. Paul      Technician: CW

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**Sample Information:**      Sample #: G-19  
Sampled By: RB  
Date Sampled: 1-30-03  
Date Received: 1-30-03  
Date Tested: 2-18-03  
Location: Boring B-10, Sample 3

<b>Laboratory Data:</b>	<u>Sieve Size</u>	<u>% Passing</u>
	1"	100
	3/4"	100
	5/8"	100
	1/2"	100
	3/8"	100
	#4	100
	#10	100
	#20	95
	#40	89
	#80	65
	#200	20.4

**Classification:**      ASTM: SM Silty Sand, fine grained, w/ a trace of Gravel, brown.  
AASHTO: A-2-4

Respectfully Submitted:

  
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## GRAIN SIZE ANALYSIS

Date: February 20, 2003      Project: 02-543      Northeast Industrial Park  
Cambridge, Minnesota  
Client: City of Cambridge  
cc: SEH, Inc - St. Paul      Technician: CW

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**Sample Information:**      Sample #: G-20  
Sampled By: RB  
Date Sampled: 1-30-03  
Date Received: 1-30-03  
Date Tested: 2-19-03  
Location: Boring B-12, Sample 5

<b>Laboratory Data:</b>	<u>Sieve Size</u>	<u>% Passing</u>
	1"	100
	3/4"	100
	5/8"	100
	1/2"	100
	3/8"	100
	#4	100
	#10	92
	#20	79
	#40	43
	#80	25
	#200	9.9

**Classification:**      ASTM: SP Poorly Graded Sand, fine grained, w/ a trace of Gravel, brown.  
AASHTO: A-1-b

Respectfully Submitted:

  
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## **GRAIN SIZE ANALYSIS**

Date: February 20, 2003      Project: 02-543      Northeast Industrial Park  
Cambridge, Minnesota  
Client: City of Cambridge  
cc: SEH, Inc - St. Paul      Technician: CW

---

**Sample Information:**      Sample #: G-21  
Sampled By: RB  
Date Sampled: 1-30-03  
Date Received: 1-30-03  
Date Tested: 2-19-03  
Location: Boring B-12, Sample 7

<b>Laboratory Data:</b>	<u>Sieve Size</u>	<u>% Passing</u>
	1"	100
	3/4"	100
	5/8"	100
	1/2"	100
	3/8"	100
	#4	100
	#10	89
	#20	72
	#40	39
	#80	21
	#200	8.2

**Classification:**      ASTM:      SP Poorly Graded Sand, fine grained, w/ a trace of Gravel, brown.  
AASHTO: A-1-b

Respectfully Submitted:

  
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## GRAIN SIZE ANALYSIS

Date: February 20, 2003      Project: 02-543      Northeast Industrial Park  
Cambridge, Minnesota  
Client: City of Cambridge  
cc: SEH, Inc - St. Paul      Technician: CW

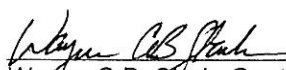
---

**Sample Information:**      Sample #: G-22  
Sampled By: RB  
Date Sampled: 1-30-03  
Date Received: 1-30-03  
Date Tested: 2-19-03  
Location: Boring B-13, Sample 3

<b>Laboratory Data:</b>	<u>Sieve Size</u>	<u>% Passing</u>
	1"	100
	3/4"	100
	5/8"	100
	1/2"	100
	3/8"	100
	#4	100
	#10	94
	#20	79
	#40	52
	#80	37
	#200	12.8

**Classification:**      ASTM:      SM Silty Sand, fine grained, w/ a trace of Gravel, brown.  
AASHTO: A-2-4

Respectfully Submitted:

  
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## GRAIN SIZE ANALYSIS

Date: February 20, 2003      Project: 02-543      Northeast Industrial Park  
Cambridge, Minnesota  
Client: City of Cambridge  
cc: SEH, Inc - St. Paul      Technician: CW

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**Sample Information:**

Sample #:	G-23
Sampled By:	RB
Date Sampled:	1-30-03
Date Received:	1-30-03
Date Tested:	2-19-03
Location:	Boring B-13, Sample 5

<b>Laboratory Data:</b>	<u>Sieve Size</u>	<u>% Passing</u>
	1"	100
	3/4"	100
	5/8"	100
	1/2"	100
	3/8"	100
	#4	100
	#10	90
	#20	67
	#40	43
	#80	22
	#200	9.8

**Classification:**      ASTM:      SP Poorly Graded Sand, fine grained, w/ a trace of Gravel, brown.  
AASHTO: A-1-b

Respectfully Submitted:

  
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## GRAIN SIZE ANALYSIS

Date: February 20, 2003      Project: 02-543      Northeast Industrial Park  
Cambridge, Minnesota  
Client: City of Cambridge  
cc: SEH, Inc - St. Paul      Technician: CW

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**Sample Information:**

Sample #:	G-24
Sampled By:	CKA
Date Sampled:	1-30-03
Date Received:	1-30-03
Date Tested:	2-19-03
Location:	Boring B-16, Sample 5

Laboratory Data:	<u>Sieve Size</u>	<u>% Passing</u>
	1"	100
	3/4"	100
	5/8"	100
	1/2"	100
	3/8"	100
	#4	100
	#10	97
	#20	77
	#40	47
	#80	24
	#200	11.9

**Classification:**      ASTM:      SP Poorly Graded Sand, fine grained, w/ a trace of Gravel, brown.  
AASHTO: A-1-b

Respectfully Submitted:

  
Wayne C.B. Stark, Geotechnical Division Manager